
Appendix M
Recreation Facilities Modification Plan



Chatfield Reservoir Recreation Facilities Modification Plan

Prepared for

Colorado Water Conservation Board
in association with
Colorado State Parks

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CHAPTER 1. INTRODUCTION

This report documents the results of a study conducted to identify opportunities and costs for the modification plan of impacts to recreation facilities and uses at Chatfield State Park that would result from an increase in the average high water level in Chatfield Reservoir. The need for this plan arises from a project called the Chatfield Reservoir Storage Reallocation Project (Reallocation Project). The Reallocation Project focuses on the feasibility of increasing the storage capacity of Chatfield Reservoir by raising the average high water level in the reservoir and reallocating a portion of flood control storage to other uses, including water supply for surrounding communities. As described in more detail later in this report, the recreation facilities modification plan is based on an increase in the average high water level by approximately 12-ft.

In addition, hydrologic model results indicate that the reservoir would experience a higher degree of fluctuation than has been historically the case or that had been indicated by earlier model results. For this reason, the initial Chatfield Reallocation Study, which was completed in 2004, was updated to reflect the new operating regime. See Appendix 5 to reference the original report.

An additional consideration that led to the revision of the 2004 report was a determination by the U.S. Army Corps of Engineers (USACE) that the 10-year flood pool elevation was 5454', an elevation several feet higher than the 5447' elevation used in the 2004 report. Per applicable USACE guidance, no structures such as restrooms or other closed buildings can be located within the 10-year flood pool. This determination required a reconsideration of additional design alternatives, including an increased amount of fill to elevate structures above the 10-year flood pool. Ultimately, as documented in Appendix 6, USACE approved an exception to their policies, thus allowing functionally-dependent structures to be located within the 10-year flood pool at an elevation of 5447'. While the approved USACE memo significantly reduced the amounts of fill needed, Appendix 8 and 9 provide additional information about the conceptual locations and amounts of fill needed. The re-analysis of the recreation facilities is presented in Chapters 3 and 4.



Source: U.S. Corps of Engineers



Two other considerations also led to revision of the 2004 report. One is an evaluation of the feasibility of protecting the gravel pond just south of the Kingfisher Use Area with a system of constructed dikes. The gravel pond, which would be inundated at an elevation of 5444', supports a number of special uses and provides a unique setting for park visitors.

The proposed recreation facilities modification plan includes provisions to protect this pond, as discussed in Chapter 3 and detailed further in Appendix 3. Finally, the reallocation plan documented in this report more specifically assesses the need for replacing the anchoring system and winches at the marina. The results of this evaluation are described in Chapter 3 and Appendix 3.

A feasibility study on the Reallocation Project has been underway for several years and will evaluate a number of factors, including potential changes to downstream flows and to reservoir pool elevations as well as the potential consequences to water supplies, flood damages, recreation opportunities, water quality and fish and wildlife habitat. Historical stream flow records will be utilized to test the effects of different flood control and water supply regulation scenarios. The end product will be a feasibility report, including an Environmental Impact Statement (EIS), U.S. Fish and Wildlife Coordination Act Report, archeological assessment, public notice, and exhibits and supporting appendices for the study.

This recreation facilities modification plan is one element of these on-going studies. A crucial part of developing a recreation facilities modification plan for Chatfield State Park is developing an understanding of the park under historic operating conditions, including the relationship between water levels and existing facilities and how visitors use the park in an overall sense. This understanding has been combined with a review of potential modifications to the historic operating regime, as defined in the Chatfield Reservoir Reallocation Study. Through this comparison, potential effects have been identified, including specific facility and use area issues, as well as more general effects associated with the quality of the recreational experience and how this might be influenced by a new reservoir operational framework.

REPORT ORGANIZATION AND CONTENT

This report is organized in four Chapters. Chapter 2, following this Introduction, describes characteristics of the site and management of the reservoir, as well as the State Park. Chapter 3 describes the reallocation plan for an increased water level in the reservoir as well as the impacts it would cause to park facilities and programs. Chapter 3 also provides conceptual designs for the relocation of recreation sites, facilities, and other infrastructure. Chapter 4 provides a cost estimate for the redevelopment of recreation sites, facilities, and other infrastructure. This chapter also reviews other revenue related issues, including the potential for revenue losses during the period when construction is occurring for the redevelopment of park facilities and sites. An appendix provides more detail on the cost estimate, roadway analysis, and other plan considerations.

CHAPTER 2. SITE CHARACTERISTICS

Chatfield Reservoir is owned and operated by the USACE. The Reservoir was completed in 1976 for purposes of flood protection for the metropolitan Denver area following the disastrous South Platte flood of 1965. The recreation rights to the reservoir are leased by Colorado State Parks from the USACE.

Chatfield State Park is about 5,300 acres in size and includes approximately 1,500 surface-acres of water. More than 1.5 million visits occur at the park each year; the most popular recreation activities include hiking, fishing, biking, picnicking, swimming, model airplane flying, horseback riding, boating, hot air ballooning, bird watching, wildlife viewing, and environmental education programs.

Chatfield is one of the most complete parks in Colorado. Major facilities include 197 campsites, 10 group sites, 4 major group picnic areas, 139 family picnic sites, 3 major boat ramps, 20 miles of hard surface trail, 2,528 parking spaces, 33.3 miles of paved roadway, 9.6 miles of unpaved roadway, 38 restrooms, 6 shower buildings, a maintenance shop, and a swim beach complex. In addition, the park includes a full-service livery, the Chatfield marina, and one of the most popular hot-air balloon launch areas on the Front Range.

A graphic indication of the distribution and range of recreational facilities is provided in Map 2.1 on the following page.

FLOOD HISTORY

During the early to mid-1900s, flooding on the South Platte repeatedly caused damage in the Denver metro area. Flooding occurred in 1933, 1935, 1942, and 1965. In order to address this problem, the USACE began construction on the Chatfield dam in 1967. Since its construction, the reservoir

has stored water on several occasions that otherwise would have contributed to downstream flooding. The aerial photo below depicts the reservoir at an elevation 5443.1', which is more than 10-ft above the normal maximum elevation of 5432'. As can be seen in the photo, the high water that occurred on June 4, 1980 inundated many of the state park's developed use areas and facilities. Remarkably, the water elevation shown in the photo is less than a foot below the operating level addressed in this reallocation study, thus providing a good indication of what areas would be affected by an increase to 5444'.

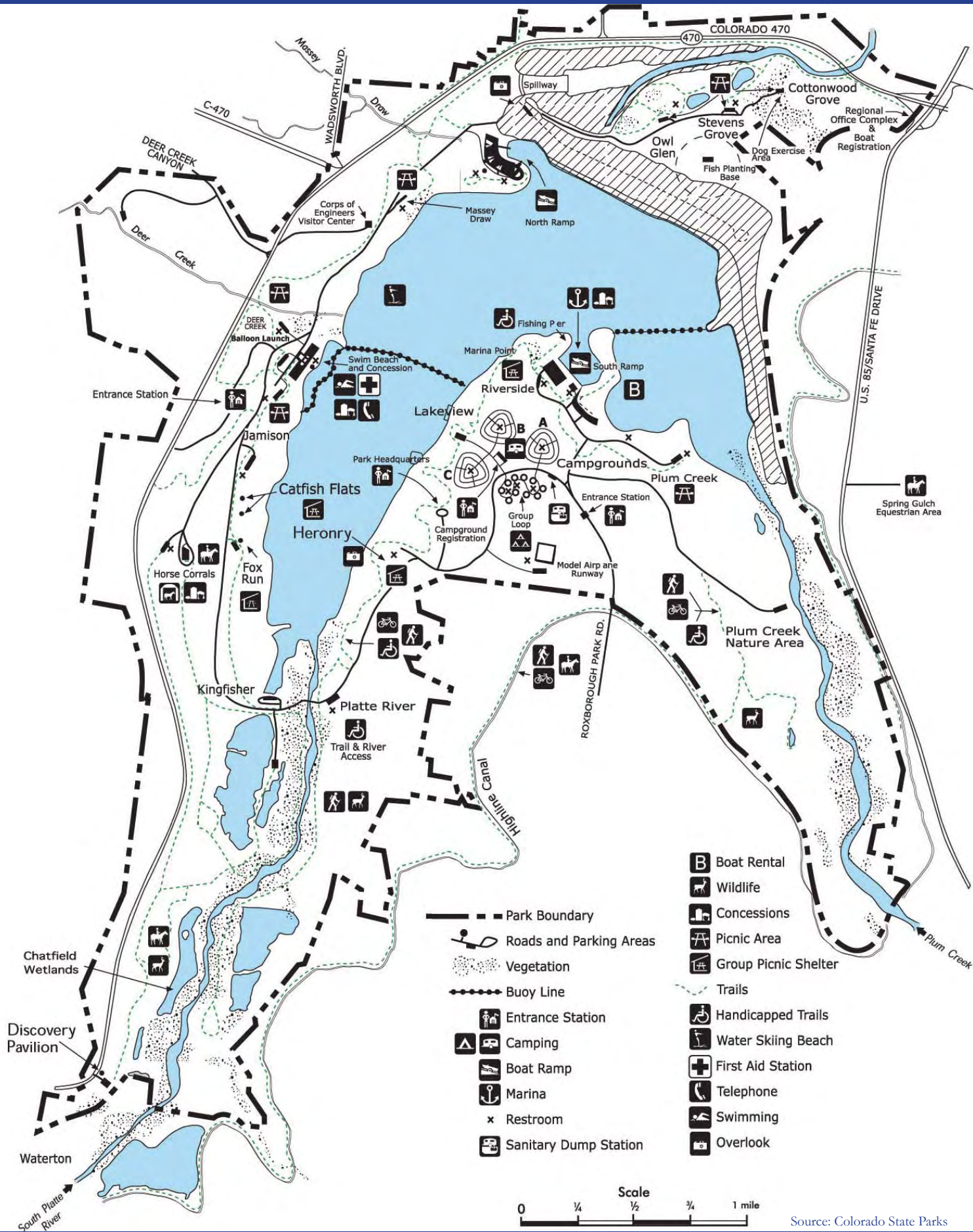
EXISTING AND POTENTIAL RESERVOIR OPERATIONS

Chatfield Reservoir has a maximum depth of about 45-ft to 50-ft and an average depth of 24-ft (Weber 1990a, Babcock 1987). Water levels in the reservoir vary in response to climatic conditions and other factors, but in general the reser-



Aerial photograph from 1980 showing a flood at 5443' elevation. Notice that there were fewer facilities at this time, and some are inundated.
Source: U.S. Army Corps of Engineers





voir has been managed to maintain water levels within a 9-ft range (elevation 5425' to 5434') (USACE 2000). From 1976 to 1996, the change in water level was within this 9-ft range approximately 80 percent of the time. The average range of mean monthly elevations is small, less than 3-ft from low to high lake periods.

An important element of the Chatfield Reservoir Storage Reallocation Project studies was the modeling of various potential operation scenarios (Chatfield Reallocation Study Storage Use Patterns, Brown and Caldwell, 2003). A key conclusion of this study states: "... there is additional storage space available in Chatfield Reservoir, and ... there are sufficient water rights and demand to utilize this additional storage." Although several scenarios were modeled in the Brown and Caldwell study, the recreation relocation study described in this report is based on the highest water elevation scenario, which would result in raising the reservoir to an elevation of 5444', or approximately 12-ft above the existing normal maximum operating level of 5432'. Updated model results are described later in this section.

Map 2.2 is an aerial photo of the reservoir with a colored line that depicts a water elevation of 5444'. A general sense of what recreation use areas would be affected by this elevation can be derived from this map.

Key areas that would be affected include the following:

- North Boat Ramp
- Massey Draw
- Swim Beach Area
- Catfish Flats/Fox Run Group Use Areas
- Kingfisher/Gravel Ponds/Platte River Trailhead Areas
- Marina Area
- Plum Creek Area

The operating regime associated with a reservoir elevation at 5444' results in an increased frequency of larger, seasonal water surface fluctuations. Table 2.1 summarizes the increase in magnitude of seasonal water surface elevation fluctuation over the 59-year period of record that was modeled. The average recreational season (June through September) water surface elevation fluctuation with historic operations and the existing normal high water elevation of 5432' is 6.7-ft. The raised water surface alternative (5444') increases the average recreational season fluctuation to 11.9-ft – an increase of 5.2-ft.

Table 2.1. June through September Water Surface Fluctuation

Reservoir Water Surface	Average Water Surface Fluctuation (ft)	Years with more than 15-Ft Fluctuation (out of 59-year record)
5432' (historic operations)	6.7	5
5444' (modeled results for Chatfield Reallocation Projects)	11.9	20

Source: USACE Model Results

A more significant operations challenge may be presented by larger fluctuations that occur infrequently but regularly. Over the 59-year historic period of record (1942 to 2000) that was modeled, historic operations (5432') had 5 years with more than 15-ft of fluctuation. In contrast, the 5444' alternative has 20 years when the water surface elevation fluctuation is greater than 15-ft.

Figures 2.1 and 2.2 (page 2-5) show the yearly difference between the seasonal maximum (red dash) and seasonal minimum (blue dash) water surface elevations.

Some key conclusions are noted below:

- Raising the reservoir elevation from 5432' to 5444' results in higher water surface elevations throughout the recreational season. With the new operating regime modeled for a reservoir at 5444', the surface area of the reservoir would increase and the amount of area available for boating, fishing and other activities would be larger at all times of the year as well as under all hydrological conditions that were modeled over the 59-year period of record.
- By modifying the reservoir storage and management practices, operations of park facilities and use areas will need to deal with potential water surface elevations regularly ranging from 5444' to 5426'. This creates a need to relocate major facilities above the 5444' water level. Facilities such as the parking lots, restrooms, and other buildings would need to be relocated above the normal high water line.

Another consideration is the frequency that lower water conditions would occur during the primary recreation season. As shown in Figure 2.2, a level of approximately 5428' or less would be reached 15 times over the 59 year period of record, which equates to a frequency of approximately once every 4 years. The 5426' elevation was used as a low level



- High Pool - 5444
 - Low Pool - 5426
 - State Park Boundary
- Aerial Photograph: May 1999

Chatfield Reservoir

Recreational Mitigation Study

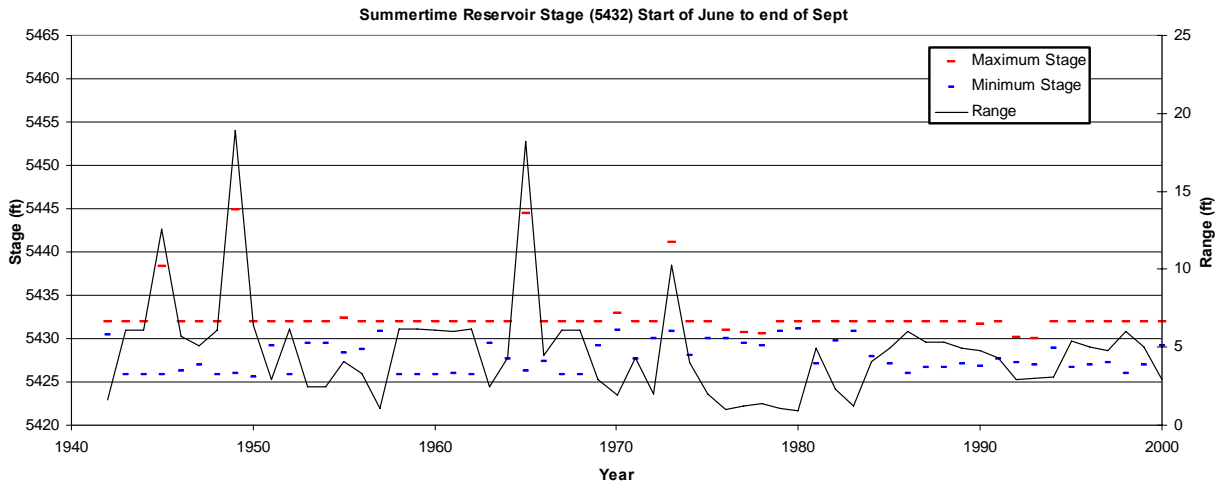


Figure 2.1. Seasonal Max and Min Water Surface, Historic Operations (5432')

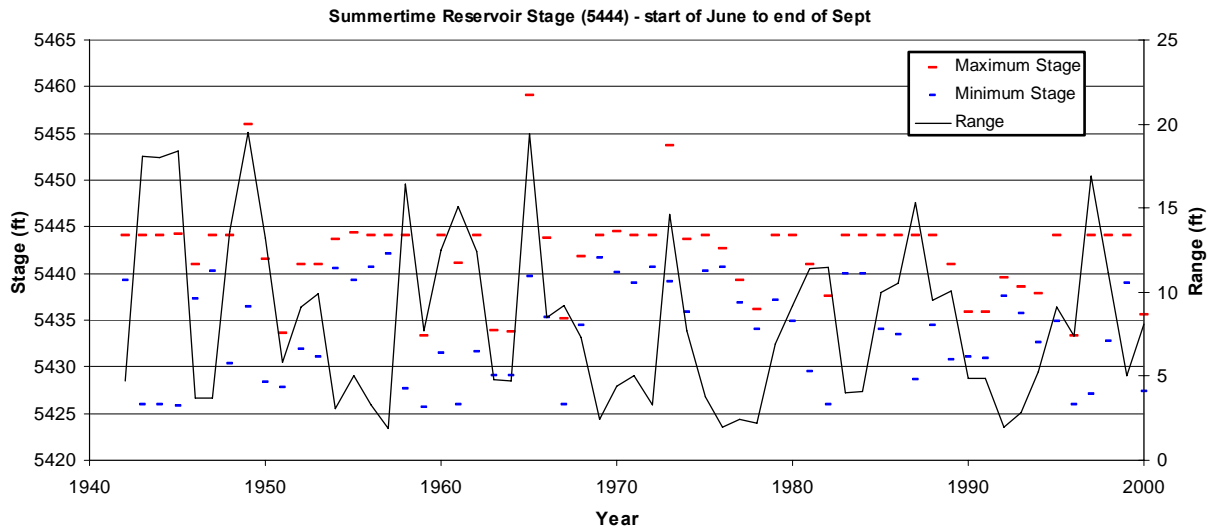


Figure 2.2. Seasonal Max and Min Water Surface, Elevation 5444'

barometer as and shown on the site maps to illustrate the distance between the high water level of 5444' and regularly occurring low water levels. On occasion, the water level will drop below 5426' during the primary recreation season between May 1 and August 31.

In addition, portions of the park road system would be inundated, including the segment crossing Deer Creek, several segments in the swim beach vicinity, and the crossing of the Platte River at the south end of the existing reservoir.

Additional details on facility effects are provided later in this section.

AFFECTED RECREATIONAL USE AREAS AND FACILITIES

The discussion that follows focuses on the affected use areas and provides an area-by-area description of what facilities

would have to be relocated or redeveloped. Areas that would not be directly influenced by inundation, such as the campgrounds, are not considered in this discussion. The areas that would be affected include the following:

- North Boat Ramp
- Massey Draw
- Swim Beach Area
- Catfish Flats/Fox Run Group Use Areas
- Kingfisher/Gravel Ponds/Platte River Trailhead Areas
- Marina Area
- Plum Creek Area

These recreational use areas and the other natural areas that are at or below the 5444' contour make up a loss of approximately 573 acres of upland vegetation habitat.

NORTH BOAT RAMP

This is the only formal boat launch area on the west side of the reservoir. It includes two ramps, paved parking and circulation areas, and a variety of support facilities. The area also includes a series of picnic shelters. Table 2.2. provides a complete listing of facilities in the area, noting which of these would be influenced by a water level increase to 5444'.

Map 2.3. is an aerial photo depicting the area with the 5444' water elevation shown. As can be seen in the photo, the two existing boat ramps would largely be inundated and several of the picnic shelters would also be affected. Remaining areas, including most of the parking and circulation roads, would remain above the normal high water line.

Table 2.2. North Boat Ramp Inventory

Item	Unit	Unit Quantity	Inundation at Elevation 5444'
Parking Areas			
Asphalt	SF	400,000	Partial inundation
Boat Ramps			
Concrete	SF	16,800	Yes
Docks	Each	4	NA
Trails			
Concrete Trails	SF	60,000	Partial inundation
Architecture			
Restroom Building -West	Each	1	NO
Restroom Building	Each	1	NO
Day Use Shelter	Each	4	YES
Day Use Shelter - West	Each	4	NO
Information Kiosk	Each	2	NO
Furniture			
Picnic Tables	Item	32	50%
Benches	Item	1	NO
Water Fountain	Item	4	NO
Dumpsters	Item	3	NO
Trash Receptacles	Item	7	50%
Bollards	Item	4	YES
Grills	Item	8	50%
Regulatory Signs	Item	46	30%
Utilities			
Water Hydrants	Item	2	50%
Lift Station	Item	2	NO
Telephone	Item	1	NO
Electrical			
Transformers	Item	1	NO
Light Poles	Item	26	NO





MASSEY DRAW

Massey Draw is another popular use area located in the vicinity of the North Boat Ramps. Facilities located in this area are also listed in Table 2.3. and depicted in Map 2.4. The beach area, including a volleyball court and horseshoe pits, would be inundated at 5444’.

Table 2.3. Massey Draw Inventory

Item	Unit	Unit Quantity	Inundation at Elevation 5444’
Parking Area			
Gravel	SF	34,000	NO
Wheel Stops	Item	34	NO
Trails			
Asphalt Trails	SF	9,304	50%
Architecture			
Restroom Building	Each	1	NO
Furniture			
Picnic Tables	Item	8	YES
Benches	Item	3	YES
Dumpsters	Item	2	NO
Trash Receptacles	Item	3	YES
Grills	Item	8	YES
Regulatory Signs	Item	12	NO
Fencing	LF	487	NO
Recreational Facilities			
Beach Volleyball Court	Item	1	YES
Horse Shoe Pits	Item	2	YES





SWIM BEACH AREA

EAGLE COVE/DEER CREEK

The Swim Beach Area also includes the Deer Creek Area with its balloon launch facilities and day use sites. The balloon launch area is very popular and hosts an annual balloon festival that attracts thousands of visitors. Facilities in this area are listed in Table 2.4. and depicted in Map 2.5. An increase in water elevation to 5444' would inundate most of the area and require that these facilities be developed at another location.

Another use area in this vicinity is Eagle Cove, which is located just north of Deer Creek. The limited facilities in this area are listed in Table 2.5. and illustrated in Map 2.5. All of the facilities in this area would have to be relocated.

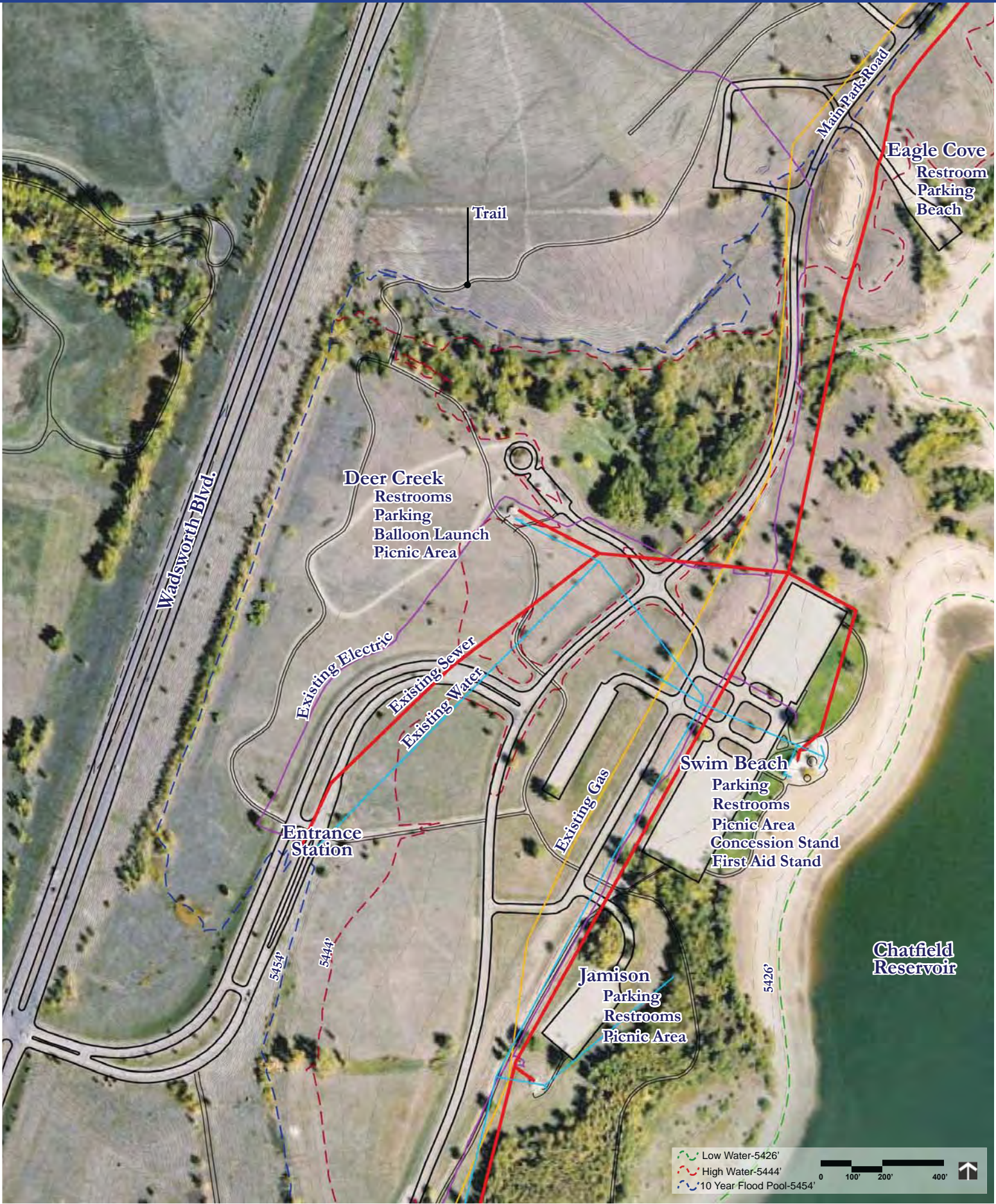
Table 2.5. Eagle Cove Inventory

Item	Unit	Unit Quantity	Inundation at Elevation 5444'
Parking Area			
Wheel Stops	Item	29	YES
Gravel	SF	13,000	75%
Architecture			
Portable Restroom	Each	1	YES
Furniture			
Dumpsters	Item	1	YES
Trash Receptacles	Item	1	YES
Regulatory Signs	Item	2	YES
Fencing	LF	84	YES

Table 2.4. Deer Creek Inventory

Item	Unit	Unit Quantity	Inundation at Elevation 5444'
Parking Area			
Asphalt	SF	26,000	50%
Gravel Staging Road	SF	34,000	NO
Wheel Stops	Item	28	50%
Trails			
Concrete Trails	SF	18,000	YES
Foot Bridge	LF	15'	YES
Architecture			
Restroom Building	Each	1	NO
Information Kiosk	Each	1	NO
Furniture			
Picnic Tables	Item	12	YES
Benches	Item	1	NO
Water Fountain	Item	2	NO
Dumpsters	Item	1	NO
Bollards	Item	4	NO
Trash Receptacles	Item	2	YES
Grills	Item	11	YES
Regulatory Signs	Item	5	50%
Wind Sock	Item	1	
Landscape			
Landscaped Island	SF	3,421	NO
Decorative Stone Retaining Wall	LF	54	NO
Utilities			
Water Hydrants	Item	1	NO
Electrical			
Transformers	Item	1	NO





SWIM BEACH

This is a key use area that is heavily visited. Swimming is the most popular visitor activity at Chatfield State Park. Major development has occurred in this area, including large parking areas, a swim beach with graded slopes and sand, and a wide variety of support facilities such as restrooms, concession buildings, and others. The area also includes an extensive network of walkways and trails. Facilities are itemized in Table 2.6.

As shown in Map 2.5., all of this area would be inundated at a water elevation of 5444' and would have to be relocated.

Table 2.6. Swim Beach Inventory

Item	Unit	Unit Quantity	Inundation at Elevation 5444'
Parking Area			
Asphalt	SF	238,000	YES
Wheel Stops	Item	274	YES
Trails			
Concrete Trails	SF	5,112	YES
Architecture			
Swim beach Shower/ Restroom Building	Each	1	YES
Swim beach Concession Building	Each	1	YES
Swim beach First Aid Station	Each	1	YES
Information kiosk	Each	2	YES
Furniture			
Picnic Tables	Item	12	YES
Benches	Item	7	YES
Water fountain	Item	2	YES
Dumpsters	Item	4	YES
Trash Receptacles	Item	10	YES
Bollards	Item	6	YES
Grills	Item	8	YES
Regulatory Signs	Item	17	YES
Fencing	LF	929	YES
Recreational Facilities			
Lawn	SF	80,000	YES
Beach Volleyball Court	Item	0	YES
Horse Shoe Pits	Item	0	YES
Sand	CY	6,500	YES

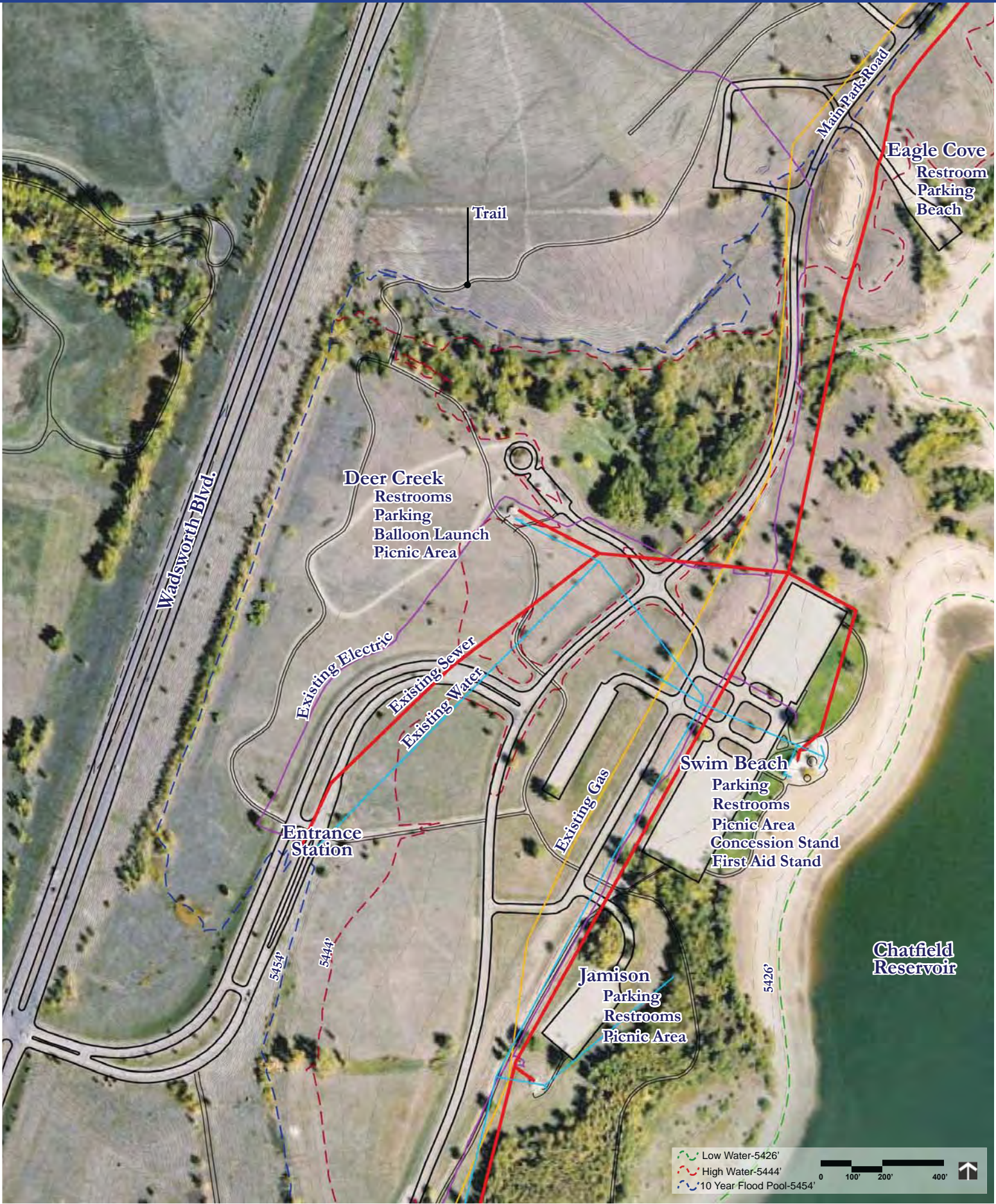
Utilities			
Water Hydrants	Item	2	YES
Lift Station	Item	1	YES
Telephone	Item	2	YES
Electrical			
Light poles	Item	1	YES
Electrical Transformer	Item	2	YES

JAMISON GROUP USE AREA

Just south of the swim beach Areas is the Jamison Group Use Area, which includes a parking area, restroom, and picnic tables. All of these would be inundated at 5444'.

Table 2.7. Jamison Inventory

Item	Unit	Unit Quantity	Inundation at Elevation 5444'
Parking Area			
Asphalt	SF	41,500	YES
Wheel Stops	Item	61	YES
Trails			
Concrete Trails	SF	30,000	YES
Architecture			
Jamison Restroom	Each	1	YES
Furniture			
Picnic Tables	Item	4	YES
Benches	Item	1	YES
Water fountain	Item	2	YES
Dumpsters	Item	1	YES
Trash Receptacles	Item	1	YES
Grills	Item	4	YES
Regulatory Signs	Item	9	YES
Utilities			
Lift Station	Item	1	YES
Electrical			
Electrical Transformer	Item	1	YES



CATFISH FLATS/FOX RUN GROUP USE AREAS

These areas consist of a series of group use areas that include picnic shelters, restrooms, parking, and related facilities. A complete listing of facilities is provided in Tables 2.8. and 2.9. Map 2.6. depicts the relationship between these facilities and a water elevation of 5444'. At this water elevation, all of these facilities would be inundated and they would have to be redeveloped at another location. Portions of the trail system would also have to be redeveloped.

Table 2.8. Catfish Flats Inventory

Item	Unit	Unit Quantity	Inundation at Elevation 5444'
Parking Area			
Asphalt	SF	61,000	YES
Wheel Stops	Item	79	YES
Trails			
Concrete Trails	SF	18,392	YES
Architecture			
Restroom Building	Each	1	YES
Group Picnic Area 1 (closest to parking)			
Walls	LF	135	YES
Group Shelters	Each	1	YES
Gravel Pavement	SF	3,450	
Picnic Tables	Item	10	YES
Electrical Hookup	Each	0	
Group Picnic Area 2 (furthest from parking)			
Walls	LF	135	YES
Group Shelters	Each	1	YES
Gravel Pavement	SF	3,000	
Picnic Tables	Item	8	YES
Electrical Hookup	Each	0	
Furniture			
Picnic Tables	Item	5	YES
Benches	Item	1	YES
Water fountain	Item	2	YES
Dumpsters	Item	1	YES
Trash receptacles	Item	1	YES
Regulatory Signs	Item	9	YES
Utilities			
Water Hydrants	Item	3	YES
Lift Station	Item	1	YES
Electrical			
Electrical Transformer	Item	1	YES

Table 2.9. Fox Run Inventory

Item	Unit	Unit Quantity	Inundation at Elevation 5444'
Parking Area			
Gravel	SF	31,000	NO
Trails			
Concrete Trails	SF	47,688	50%
Architecture			
Portable Restrooms	Each	2	NO
Group Picnic Area			
Walls	LF	135	YES
Group Shelters	Each	1	YES
Gravel Pavement	SF	3,450	YES
Picnic Tables	Item	8	YES
Electrical Hookup	Each	0	
Furniture Group Shelters			
Picnic Tables	Item	0	YES
Benches	Item	0	YES
Water Fountain	Item	0	YES
Dumpsters	Item	1	YES
Trash Receptacles	Item	2	YES
Regulatory Signs	Item	5	50%
Fencing	LF	716	NO
Recreational Facilities			
Beach Volleyball Court	Item	1	YES
Horse Shoe Pits	Item	2	YES
Utilities			
Water Hydrants	Item	1	NO



KINGFISHER/GRAVEL PONDS/PLATTE RIVER TRAILHEAD AREAS

A variety of uses occur at this end of the reservoir, especially around the gravel ponds that lie between the reservoir and the main park road that leads to the Campground and Marina Area. The large gravel pond is used by dog training clubs, non-motorized boaters, fishermen, and others. There are relatively few developed facilities in this area, primarily parking areas and trails. These are listed in Tables 2.10 - 2.12. Map 2.7. shows the area in detail and highlights the fact that all existing facilities in this area would be inundated at 5444'.

Table 2.10. Kingfisher Area Inventory

Item	Unit	Unit Quantity	Inundation at Elevation 5444'
Parking Area			
Gravel	SF	38,000	YES
Wheel Stops	Item	28	YES
Furniture			
Portable Restrooms	Each	1	YES
Dumpsters	Item	1	YES
Trash Receptacles	Item	1	YES
Regulatory Signs	Item	3	YES
Fencing	LF	375	YES

Table 2.11. Gravel Ponds Area Inventory

Item	Unit	Unit Quantity	Inundation at Elevation 5444'
Parking Area			
Gravel	SF	86,500	YES
Wheel Stops	Item	38	YES
Architecture			
Portable Restrooms	Each	1	YES
Furniture			
Picnic Tables	Item	4	YES
Dumpsters	Item	1	YES
Trash Receptacles	Item	1	YES
Regulatory Signs	Item	18	YES
Fencing	LF	596	YES

Table 2.12. Platte River Trailhead Area Inventory

Item	Unit	Quantity	Inundation at Elevation 5444'
Parking Area			
Asphalt	SF	19,000	NO
Wheel Stops	Item	87	NO
Trails			
Concrete Trails	SF	9,000	50%
Architecture			
Restroom Building	Each	1	NO
Furniture			
Picnic Tables	Item	0	NO
Benches	Item	2	NO
Dumpsters	Item	0	NO
Trash receptacles	Item	2	NO
Regulatory Signs	Item	7	NO
Fencing	LF	743	NO



MARINA AREA

This is a major use area that has been extensively developed. The area includes the marina itself, a fishing pier, extensive paved parking areas, a boat ramp, group picnic sites, and an extensive network of walkways and trails. A detailed list of facilities is provided in Table 2.13.

Map 2.8. shows the area in detail and depicts the 5444' water elevation. Nearly all of the existing facilities in this area would be affected by an increase in the water level to 5444' and most of the area would have to be redeveloped.

Table 2.13. Marina Area Inventory

Item	Unit	Unit Quantity	Inundation at Elevation 5444'
Boat Ramp - concrete	SF	4,750	YES
Parking Area			
Asphalt	SF	148,000	YES
Wheel Stops	Item	36	YES
Trails			
Concrete Trails	SF	7,000	YES
Architecture			
Concessions Building	Each	1	YES
Shower/ Restroom Building	Each	1	YES
Day Use Shelter	Each	1	YES
Information Kiosk	Item	1	YES
Riverside Marina Slips	Item	320	YES
Group Picnic Area			
Walls	LF	135	YES
Group Shelters	Each	2	YES
Concrete Pavement	SF	5,088	YES
Picnic Tables	Item	10	YES
Electrical Hookup	Each	2	YES
Furniture			
Picnic Tables	Item	10	YES
Benches	Item	1	YES
Water Fountain	Item	1	YES
Dumpsters	Item	4	YES
Trash Receptacles	Item	4	YES
Regulatory Signs	Item	37	YES
Recreational Facilities			
Beach Volleyball Court	Item	1	YES
Horse Shoe Pits	Item	2	YES

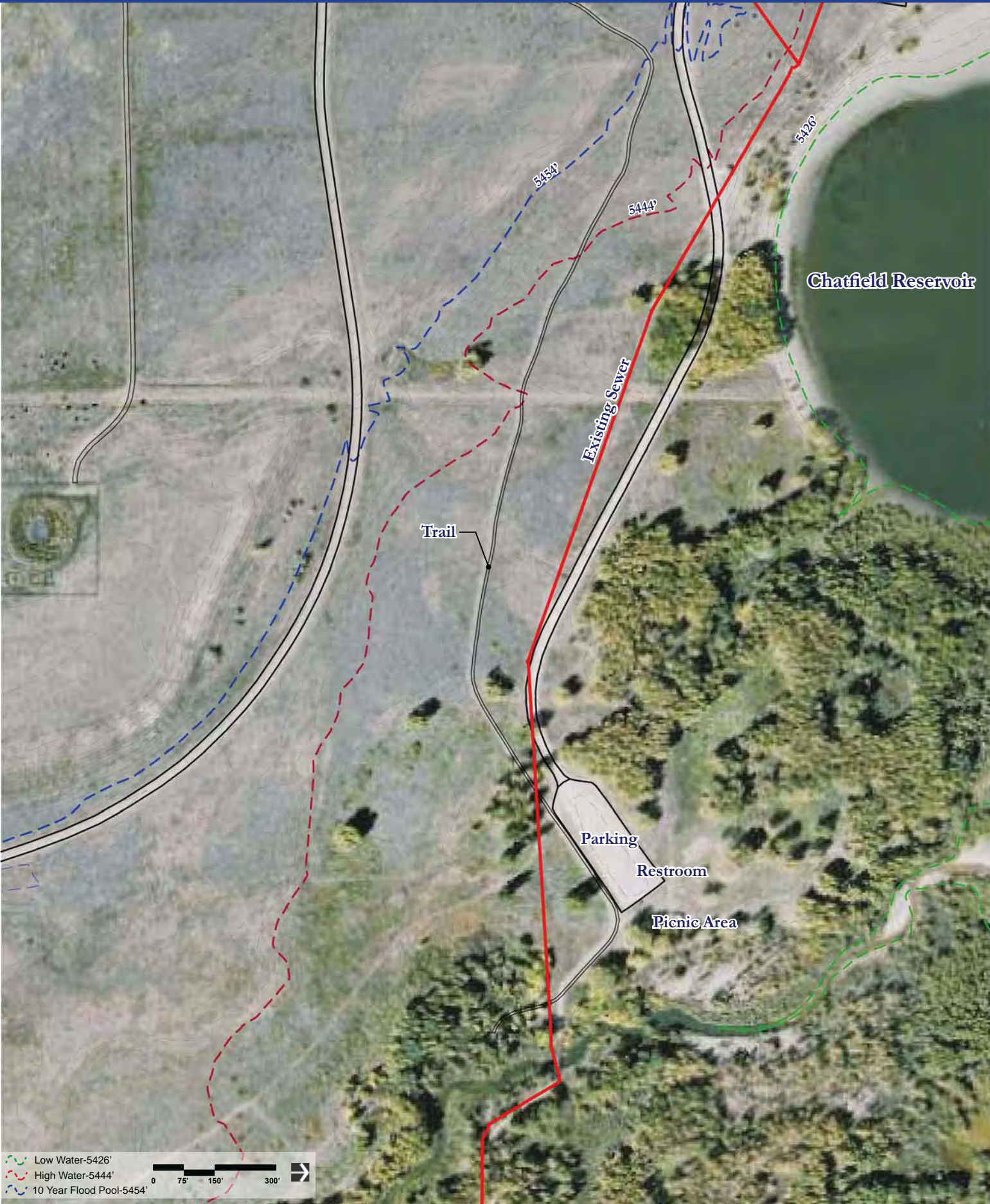


PLUM CREEK AREA

This area serves as a trailhead and also has a day use area with tables, a restroom, and parking. A list of facilities in this area is provided in Table 2.14. Map 2.9. shows the current area layout.

Table 2.14. Plum Creek Inventory

Item	Unit	Unit Quantity	Inundation at Elevation 5444'
Parking Area			
Gravel	SF	35,000	YES
Trails			
Concrete Trails	SF	7,200	YES
Architecture			
Restroom Building	Each	1	YES
Furniture			
Picnic Tables	Item	11	YES
Benches	Item	1	YES
Dumpsters	Item	1	YES
Regulatory Signs	Item	2	YES
Fencing	LF	697	YES
Recreational Facilities			
Volleyball	Item	1	YES



VISITATION CHARACTERISTICS

Key characteristics of visitation to Chatfield State Park are summarized in this section.

Swimming is the most popular activity, followed by boating. Hiking, fishing and camping are also very popular activities. Visitor activity preferences are summarized below:

Activity Participation Rates	
Hiking	23%
Fishing	21%
Picnicking	24%
Photography	7%
Visitor Center	1%
Swimming	41%
Motorized Boating	35%
Bicycling	11%
Camping	18%
Wildlife/Nature Observations	11%

Source: State Parks Market Assessment, 2003

The age distribution of visitors to Chatfield is concentrated among three age groups. The great majority (76%) are between 25 and 54, with the 35-44 age group representing the largest single age group. These statistics are summarized below:

Demographic Profile of Visitors	
18-24 years old	4%
25-34 years old	22%
35-44 years old	32%
45-54 years old	22%
55-64 years old	10%
65 + years old	9%

Source: State Parks Market Assessment, 2003

Visitation to Chatfield occurs year-round but is concentrated in the summer months. More than one half of total annual visits occurs during the four month period of May-August. Visitation distribution for the year 2003 is summarized in Table 2.15.

Table 2.15. Monthly Visitation to Chatfield State Park in 2003

Month	Visitors	Seasonal Distribution
January	74,179	5%
February	70,995	5%
March	78,108	5%
April	133,983	9%
May	191,702	12%
June	229,053	15%
July	217,736	14%
August	226,922	14%
September	136,312	9%
October	84,846	5%
November	58,366	4%
December	34,378	4%
Total	1,566,580	100%

Source: Chatfield State Parks Manager's Reports for 2003

NATURAL RESOURCES

Natural resources were considered in the development of the reallocation plan. A summary of these resources is provided in this section. For the most part, sensitive resource areas are not located adjacent to developed use areas at the park, and facilities and use areas can be relocated without creating resource conflicts. An exception to this statement is associated with redevelopment of the roadway system, particularly the new crossing of the South Platte that would be required by raising the water to elevation 5444' (source: Brown and Caldwell, 2003).

For more information in regards to wildlife plants and other elements of the natural environment, please refer to the Environmental Assessment being prepared by ERO and TetraTech.

CULTURAL RESOURCES

An inventory of cultural resource sites prepared by the USACE (USACE 2007) was reviewed to determine if known cultural resource sites would be affected by the reallocation plan. Based on this review, any cultural resource sites impacted by this plan will be handled according to USACE, and the Colorado State Historical Preservation Office guidelines. However, as more detailed plans are developed and construction sites are better defined, the inventory will be further reviewed.

CHAPTER 3. RECREATION FACILITIES MODIFICATION PLAN

This section presents conceptual designs for the relocation and redevelopment of park facilities that would be impacted by raising the water level of Chatfield Reservoir. As previously discussed, impacts to park facilities and programs were based on a future normal high water elevation of 5444'. Major facilities, such as buildings, main roadways, and major utilities including an Xcel gas line, forced sewer lines and water lines which had to be relocated or redeveloped, were located above or outside the 5444' elevation and provided with an additional buffer of three vertical feet, i.e., a base elevation of 5447'. As previously mentioned, USACE granted an exception to existing policy, allowing functionally-dependent structures to be located within the 10-year flood pool. This is discussed further in Appendix 6.

Any facilities or use areas that fell below, or close to, elevation 5444' were evaluated for replacement or adjustment. In some cases, an existing parking area or boat ramp would only need to be partially modified to accommodate the future water level.

An important assumption that guided the conceptual design effort was that no facility or program area would lose any capacity or functionality as the result of relocation or modification. Put another way, the recreation modification plan provides for in-kind replacement of facilities affected by higher water levels. Design and development of replaced facilities would be completed under current building codes, Colorado State Parks building requirements, and to meet American Disability Act (ADA) requirements for public facilities.

It must be emphasized that the recreation modification plan reflects a conceptual level of design. More detailed design will be required to address site-specific conditions and other design factors. Among these is the need to base the design on final reservoir operations modeling so that facility locations and features reflect the actual drawdown conditions that are anticipated after the reallocation project is further refined.

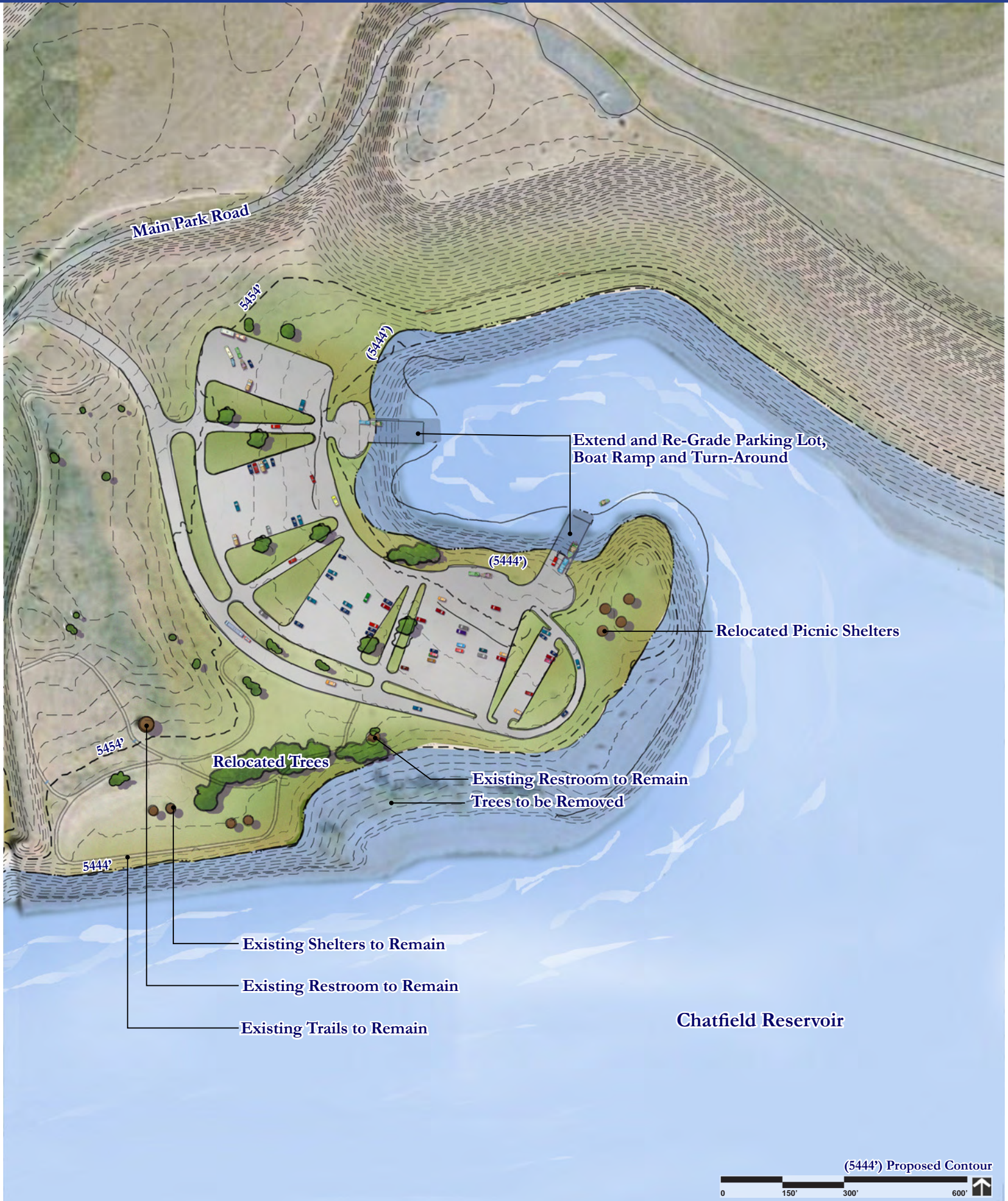
Based on conceptual level of design, costs for implementing the recreation relocation plan are presented in Chapter 4 and Appendix 1. A key assumption in developing the recreation modification plan is that fill material will be available from on-site sources and that this material can be obtained from locations below the high water line. Additional detail in regards to fill material locations, amounts and quality of the material is outlined in Appendices 8, 9, and 10, respectively.

During preliminary stages of this study, design alternatives were considered at varying levels of detail. Following review and discussion with Colorado State Parks and other study participants, a preferred concept was identified for each major use area. Only the preferred concepts are presented in this report. The following sections include detailed descriptions, recreation modification plan maps, and proposed solutions for each of the major use areas to the new high water pool elevation of 5444'.

NORTH BOAT RAMP

- Elevation 5444' results in partial inundation of this facility, with ramps becoming inoperable.
- Facilities affected include boat ramps, parking area, day use shelters, and trails.
- Boat ramps would be constructed to extend to the elevation of the existing ramps in order to operate at low water levels. The gradient (slope) on the new ramps would be reduced.
- Day use shelters and furniture would be relocated, as would trails.

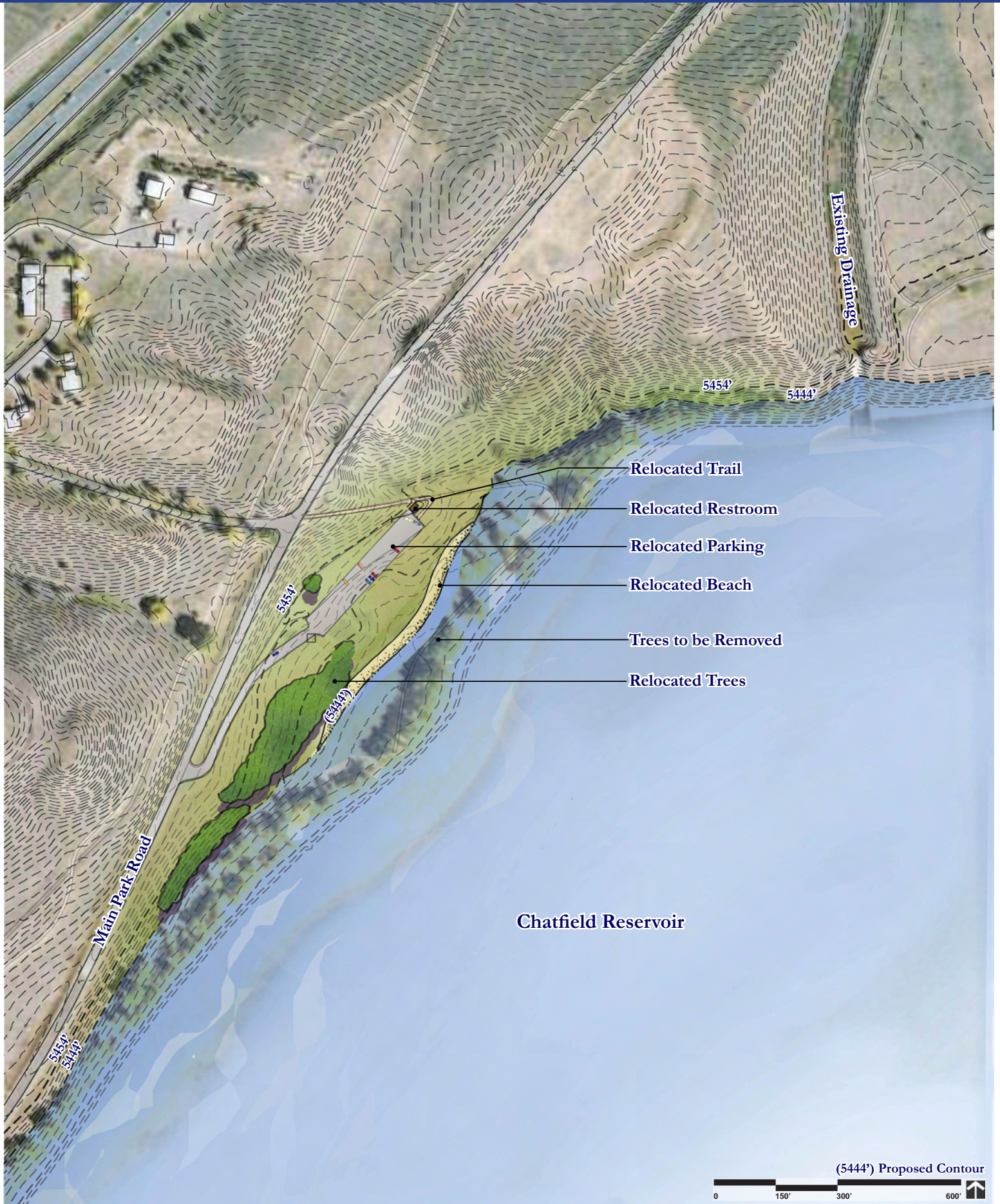
This alternative requires a substantial amount of fill to raise a portion of the parking area. The resulting concept is illustrated in Map 3.1.



MASSEY DRAW DAY USE AREA

- Raising the water level to 5444' severely reduces the recreation capacity of this area but does not inundate the existing parking area.
- While the existing vault restroom is currently above 5444', the service tank for the restroom is below the 5444'. Due to health code, the tank for the vault restroom would need to be relocated above 5444'.
- Relocation to this area would include importing fill material to raise the elevation above 5444' and create a usable recreational area in the same location with a similar amount of usable area that currently exists. Existing beach volleyball and horseshoe pits would be rebuilt. Furniture can be stored and relocated to the future area.

The resulting relocation concept is illustrated in Map 3.2.

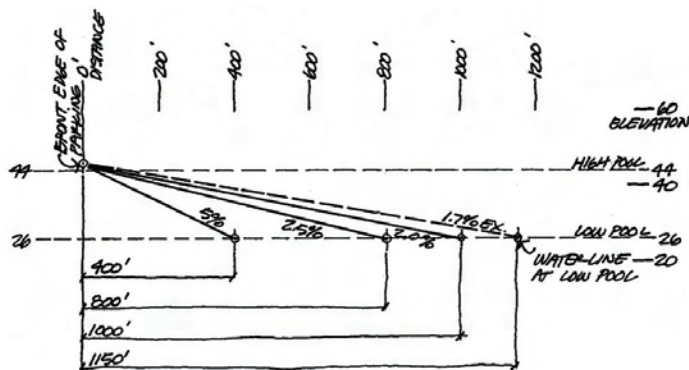


SWIM BEACH AREA

Impacts in the Swim Beach Area are the most substantial of all facilities located along the shoreline. The entire Swim Beach site and associated parking area would be inundated and a number of other facilities would also be affected. The relocation concept is described below and is illustrated in Map 3.3.

Section 3.3A. illustrates some the challenge in designing a new Swim Beach with facilities above the 5444' elevation. As the gradient of the beach decreases, the distance between the water edge and on shore facilities such as the parking area increases during low water conditions. For example, at a low gradient slope, the water becomes approximately 1200-ft from the parking area when the reservoir reaches a water surface elevation of 5426'. Conversely, if the beach slope is graded to a steeper 5% slope, this distance drops to a distance less than 400-ft.

Although there is no universally accepted rule of thumb on how far park visitors will be willing to walk in order to reach the water edge, it clearly becomes more inconvenient to walk an increased distance with beach gear and other equipment. Given a goal of replacing affected facilities and use areas "in-kind", the relocation plan is based on maintaining current walking distances at the swim beach. This could result in higher development costs and potentially higher annual maintenance costs for sand replacement, etc. However, it would result in a recreation experience similar to current conditions and eliminate the need for implementing low water management strategies, such as providing temporary restrooms and temporary parking areas below the high water line. The costs shown in Chapter 4 and Appendix 1 are based on this type of design, one that grades the beach area to minimize the distance between shore facilities and the water edge at low water conditions.



Section 3.3A.

In addition to impacts to recreation facilities, a portion of the entrance road would need to be realigned and a major segment of the main park road would have to be located further inland. Realignment of the main park road would also require a new bridge crossing of Deer Creek. The new roadway alignments specific to the Swim Beach area are shown in Map 3.3 and discussed in more detail in Appendix 2. Roadway design criteria are presented later in this chapter. All utilities servicing this area would need to be relocated.

SWIM BEACH

- Swim beach area is completely inundated at 5444'.
- The facility would be relocated to the south west of the current facility. A swim beach area of similar quality to that which presently exists could be developed at this location.
- In order to construct a beach, the existing facility will need to be demolished and excavated. Sand will need to be saved and also imported to create the new beach environment. The excavated material will assist in filling low areas that would be inundated at 5444' to ensure these areas are usable at this proposed elevation.
- The current buildings, lawn area, and recreational facilities would be rebuilt in the new location.
- The proposed location would require the Chatfield interior road to be relocated. This road would be elevated to ensure operations at 5444' and, in the case of a flood event, higher.

EAGLE COVE

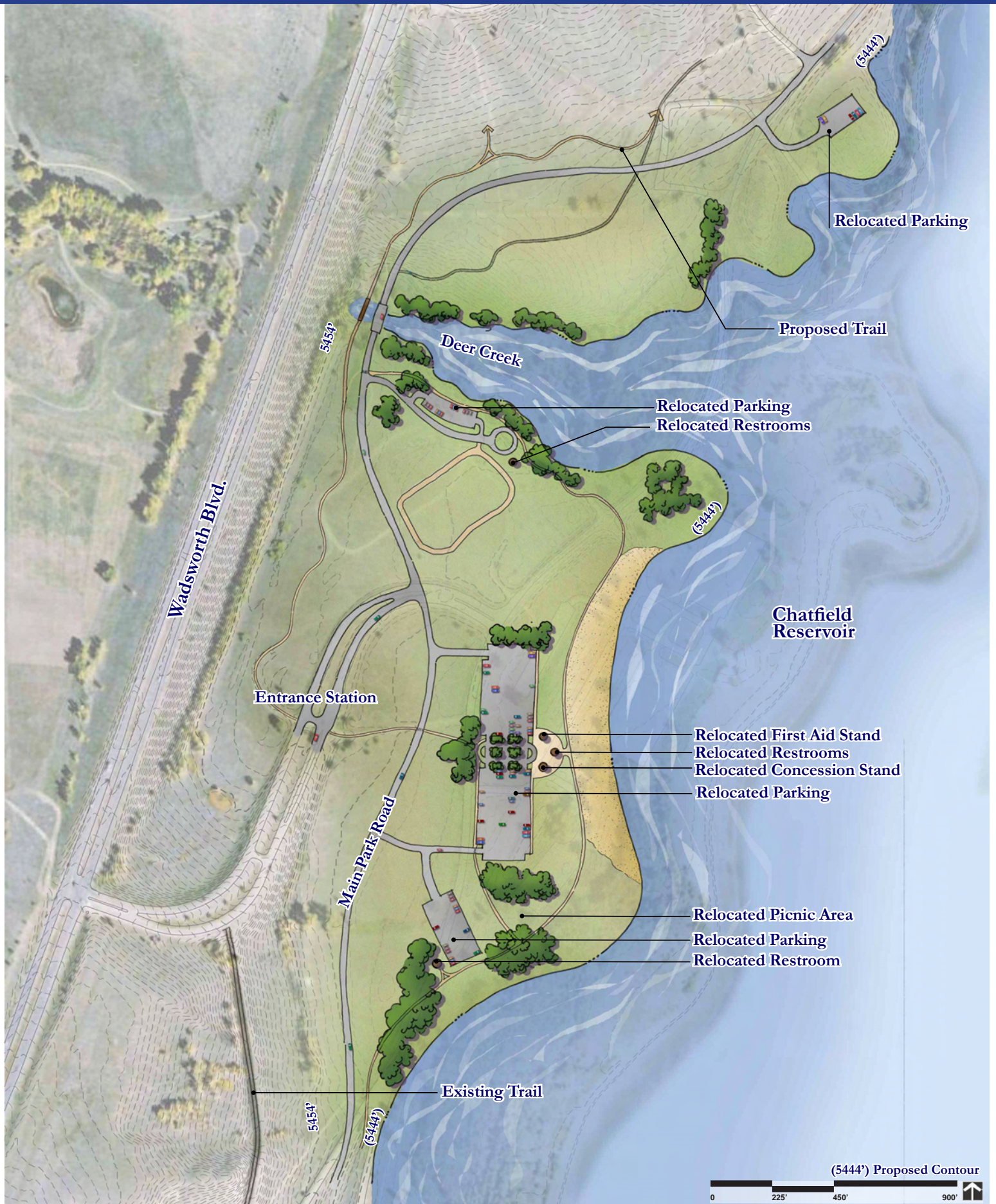
- The existing gravel parking lot and portable restroom are inundated at 5444'.
- The gravel parking lot will be redeveloped within the same general area at an elevation above 5444'.
- The use of additional fill should be minimized in this area due to existing grades above 5444'.

DEER CREEK

- Much of the Deer Creek area, or approximately 50%, is inundated at 5444'.
- All existing facilities will be redeveloped within the same general area and elevation above 5444' through the use of fill.

JAMISON DAY USE AREA

- The entire area is relocated south of current location. Parking and restroom facility will require replacement. Furniture can be relocated to the new location.







CATFISH FLATS AND FOX RUN GROUP PICNIC AREAS

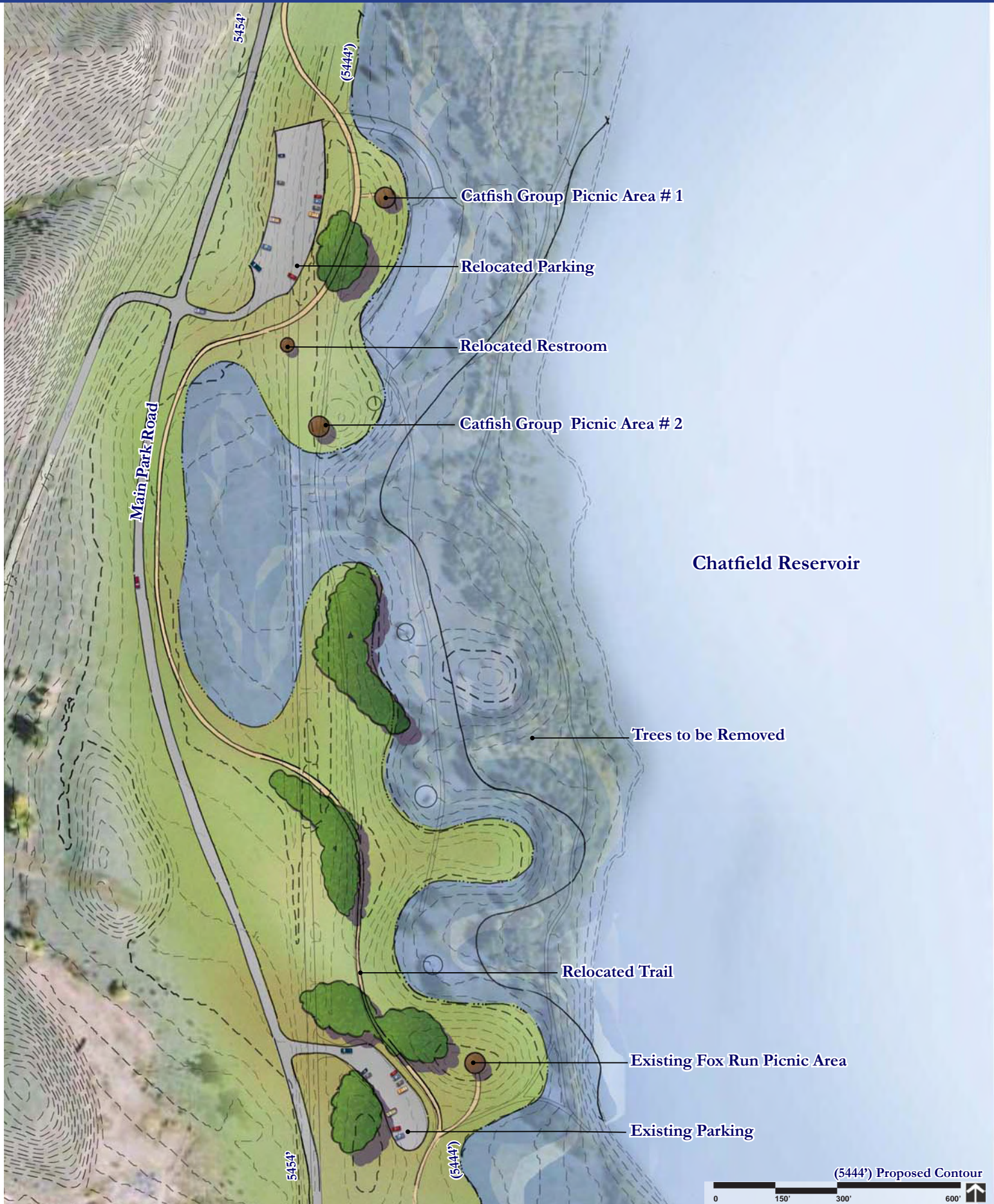
The majority of existing entrance roads, parking, shelters, restrooms, and utilities would be inundated at 5444'. New parking facilities would be developed closer to each of the group use areas, thereby enhancing access to these areas. These areas, which currently don't directly relate to the water, would have an improved setting, with each situated on an elevated site overlooking the reservoir. As noted on Map 3.4, the coves adjacent to the group use areas would be excavated, providing fill needed at other locations, but these excavations would also help to hold water during lower water conditions.

CATFISH FLATS DAY USE AREA

- Parking lot, restroom and picnic shelters will be inundated at 5444'.
- Due to the level of inundation, the picnic shelters will be located closer to the new parking lot.
- The new restroom will be in proximity to the shelters, and recreational facilities.

FOX RUN DAY USE AREA

- Existing parking and picnic facilities are not inundated at the 5444; trails in the area are also above 5444'.
- Entrance to the parking lot will need to be reconstructed due to the new location of the main park road.



KINGFISHER/GRAVEL PONDS/PLATTE RIVER TRAILHEAD AREAS

A long section of the main park road would need to be raised and a new bridge constructed across the South Platte River. The bridge would remain in the same general location and would be designed to provide for pedestrian use. As discussed below, the reconstructed road would be located on a dike constructed to protect the gravel pond.

The concept for redeveloping this area is shown on Map 3.5.

KINGFISHER DAY USE AREA

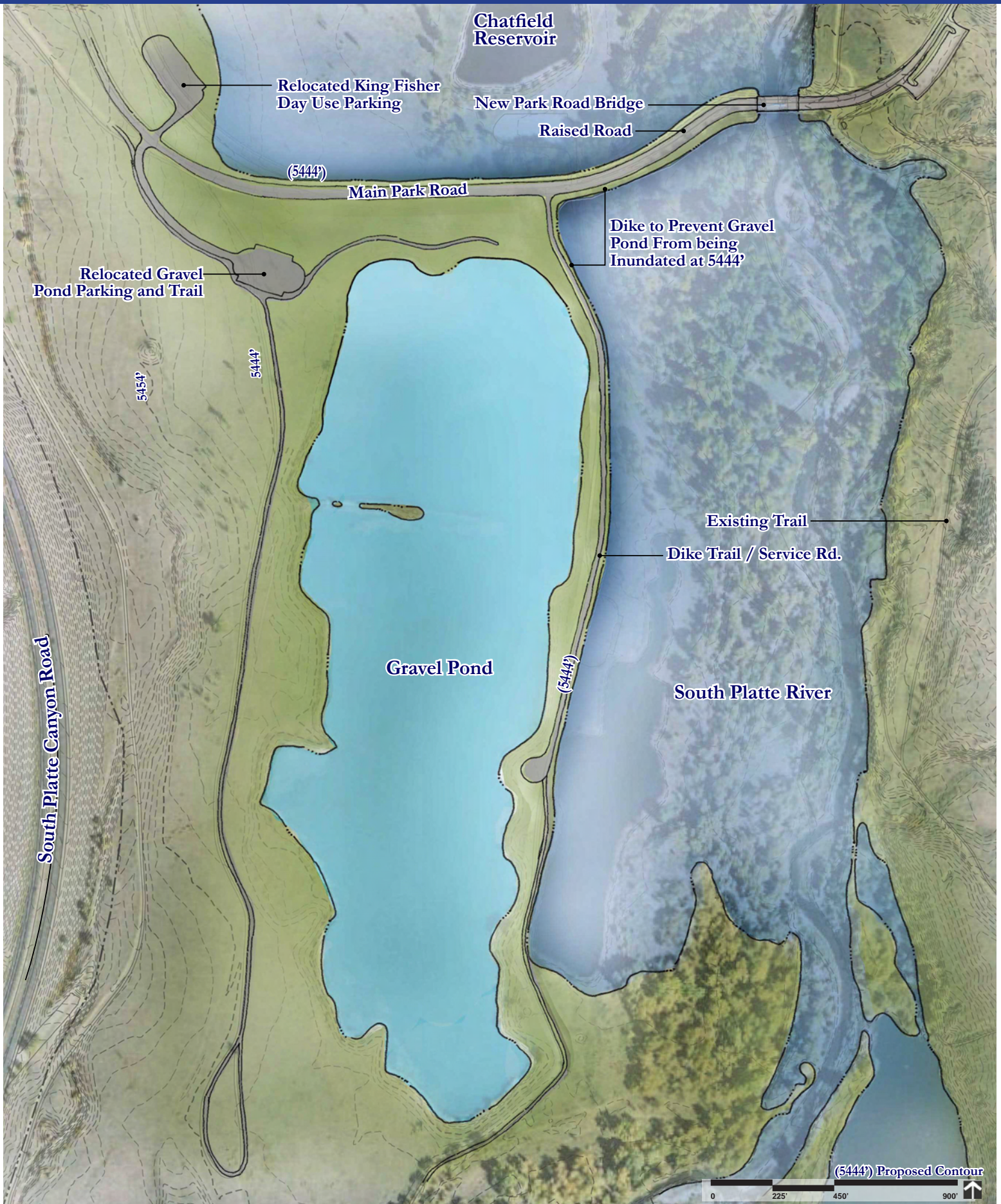
- Kingfisher area is entirely inundated at 5444’.
- A new parking area would be developed along the shoreline at a site west of its current location. The area would include a portable restroom and similar facilities to those that exist at the current site.
- Existing trail connections would be redeveloped above the high waterline to provide recreational opportunities.
- Borrow area configuration done to enhance the fishing opportunities and recreation experience.

GRAVEL PONDS

- A new parking lot will be developed west of the existing site and located above the 5444’ elevation.
- Roads for emergency access only will be developed on the berms to the east and south of the gravel pond.
- The new permeable dike will be built to an elevation of 5457’ based on the current bridge elevation above current high water level.
- Refer to Appendix 3 for more detailed specifics on the dike and the options considered.

PLATTE RIVER TRAILHEAD

- The restroom, parking lot, and trailhead are not affected by a water elevation of 5444’.
- The most significant impact to this facility is the inundation of the existing trails that lead to the Platte River. New concrete trails would be built to replace these trails.
- ADA pier accessibility.
- Grading of the new road in the area will have a minimal impact on existing facilities.



MARINA AREA

There is significantly higher topography in the Marina area, which somewhat limits impacts to shoreline facilities. The relocation concept for this area is shown in Map 3.6.

MARINA POINT/SOUTH RAMP/RIVERSIDE MARINA

- Marina Point facilities are significantly impacted at the proposed water elevation. The parking area, group day use area, volleyball, and horseshoe pits are all inundated.
- Significant earthwork in the form of earth fill needs to be accomplished to ensure future use in this area. The current facilities would be located on an elevated surface. This fill placement would include construction of new breakwaters similar to those that currently exist that would function at water elevation 5444'.
- The accessible fishing pier would be replaced in a similar location.

The following issues related to the marina operation were identified:

- The need to maintain the current anchoring scheme for the marina so the facility does not have to be routinely moved in and out during lake level fluctuations.
- The existing breakwater does not have winches and cannot be adjusted sufficiently to allow for the increased lake fluctuation levels.
- At the marina, the reservoir floor would be excavated down to 5412' to enable it to operate at extreme low water levels. This excavated material can be used to raise the breakwater elevations and provide fill for other locations. The marina would operate close to the existing location.
- The interface from the reservoir to the shore at the marina would be a rip rap embankment at 2:1 gradient. Due to the possibility of increased water level fluctuations, a sea wall was ruled out as an alternative due to the height it would need to be to function effectively. With a top of wall elevation of 5447' (3' freeboard), and a possible low water elevation of 5417', the 29-ft high visible structure was deemed too expensive and visually negative to be a reasonable option. This design would also cause access problems to the marina.
- The marina would be built on a flotation system designed to accommodate rise in water level that is above 5444' elevation.

- The parking areas, day use shelters, group use area and recreational areas associated with the South Ramp would also be inundated at 5444'. These areas would be rebuilt on fill areas in the same general location where they currently exist.
- Trails and walkways in the inundated area would be rebuilt.
- There is a distinct possibility that construction activities in the marina vicinity will result in a loss of revenue to the marina operator and state park. The window when construction could occur without significantly affecting marina operations is relatively short, extending from November through March. This is likely not enough time to complete the required reconstruction, particularly if adverse weather conditions are encountered. Potential economic effects resulting from this disruption are discussed in Chapter 4.

To maintain the existing anchoring scheme and allow the marina owner to maintain the historic levels of maintenance effort and cost related to the anchoring, new anchors will need to be constructed and installed and all existing winches will need to be replaced. When the average fluctuation of the lake is increased, the location of the existing anchors would not provide sufficient scope. The cost of moving existing anchors was evaluated, but proved to be more expensive than providing new anchors in the correct location.

These costs (rounded) are shown in Appendix 4, Attachment A. Appendix 4, Attachment B shows the scope ratio detail; Appendix 4, Attachment C shows the anchor weight calculations; and Appendix 4, Attachment D shows the cost comparison of moving vs. replacing the existing anchors.

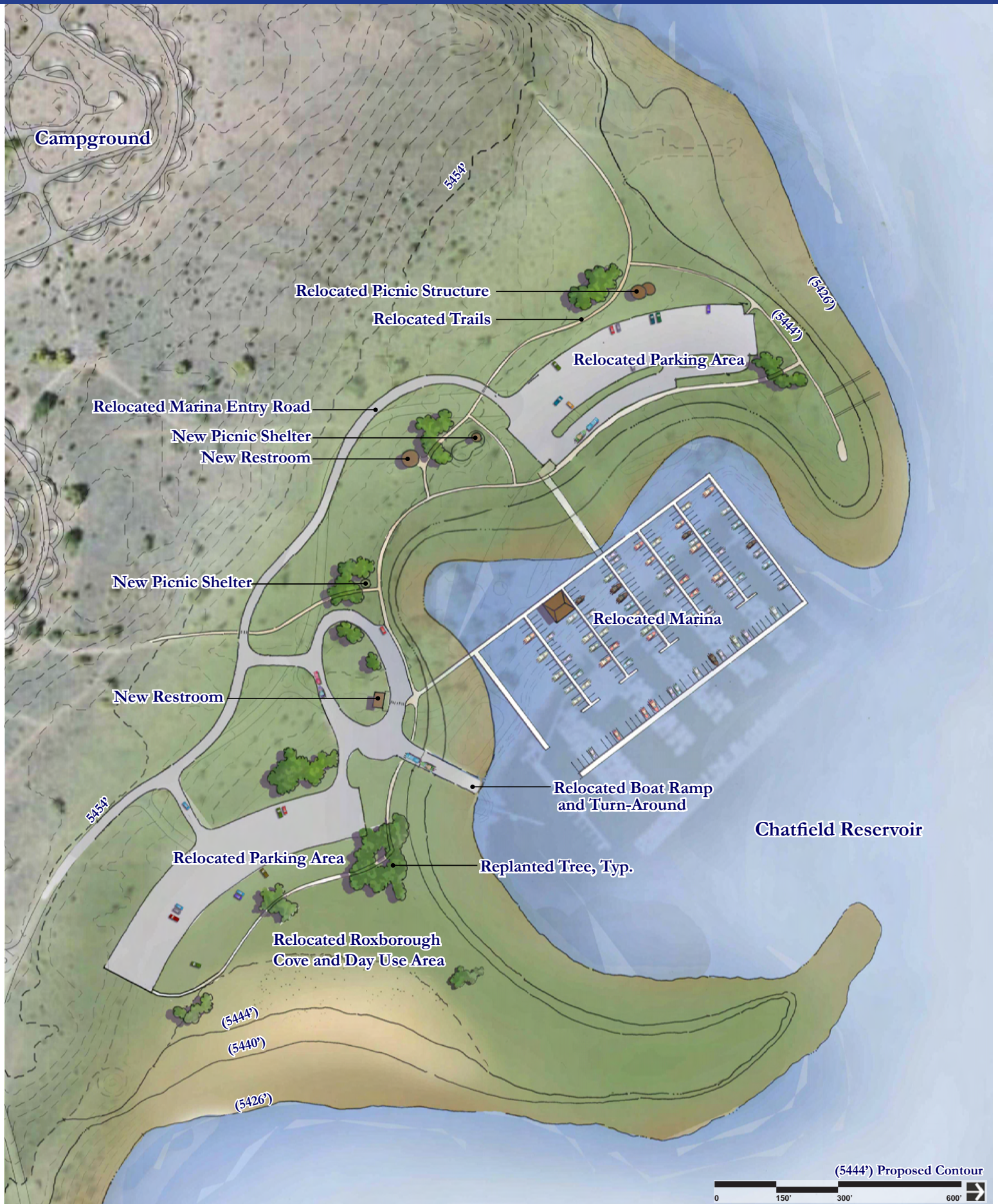
To allow the existing breakwater to be adjusted for the higher lake fluctuation levels, four flotation platforms with winches will be attached to the ends of the breakwater sections and new anchors placed.

ROXBOROUGH DAY USE AREA

- This small yet popular day use area is entirely inundated at water elevation 5444'. It would be relocated to a new location close to its existing one. Easy access to the shoreline, which it currently enjoys, would remain as the draw for this area.



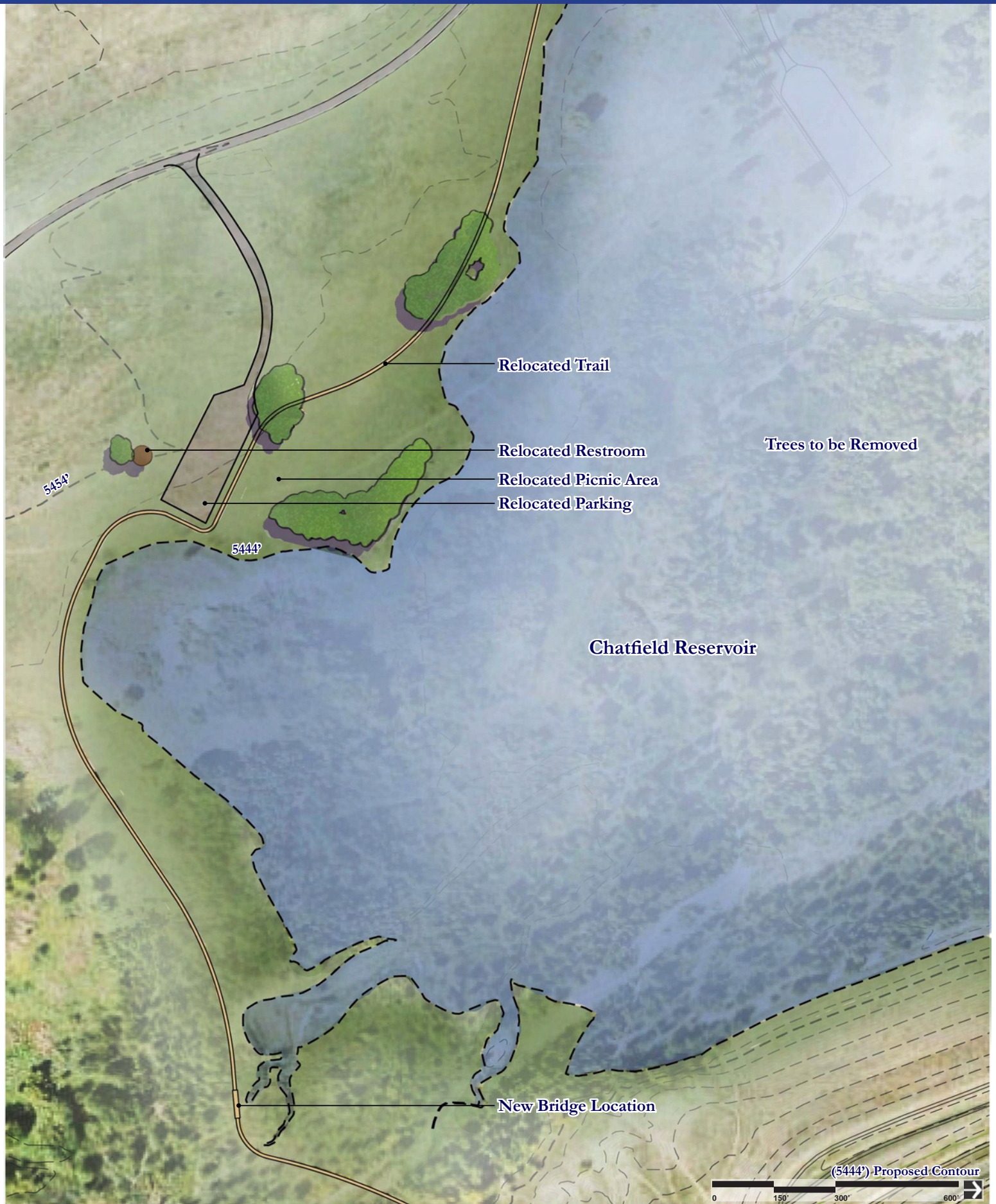




PLUM CREEK AREA

- Plum Creek Day Use Area is entirely inundated at the proposed water elevation.
- The area would be relocated to the southern edge of the reservoir. The recreational facilities would be replaced at this location and a new restroom would be built.
- The Plum Creek trailhead would be relocated to this area and inundated trail segments replaced. A new trail bridge would be built to span Plum Creek.
- The existing sanitary sewer line will need to be relocated as it is below the 5444'.

The relocation concept for this area is shown in Map 3.7.



CHAPTER 4. ECONOMICS

This chapter presents the costs associated with redevelopment of facilities affected by an increased water level. It includes a summary table showing overall costs. More detailed set of tables that itemize costs on an area-by-area basis are presented in Appendix 1.

In addition to development costs, it is likely that there would be some disruption to park visitation during the period when new recreation facilities are being constructed (refer to Appendix 7) and a corresponding diminishment of revenue derived from park visitation. Based on implementation of the recreation relocation plan and reservoir operations similar to those described in Chapter 2, a socio-economic study is being conducted in conjunction with this report in order to determine the overall effects of raising the water level to 5444' elevation.

OTHER COSTS

Chatfield Reservoir generates a substantial amount of revenue to Colorado State Parks, its concessions, and to the surrounding area. Some of this information is summarized in Table 4.1. on the following page. In 2003, revenue from fees alone was nearly \$1.5 million. It is estimated that an additional \$9.5 million was spent within the park on purchases, equipment rental, marina fees, and other items. Obviously, closure of the park or other interruptions to visitation during the construction of facilities included within the recreation relocation plan would have a significant economic impact. The magnitude of this impact will depend on construction timing, how it is phased, and other considerations that can't be defined with precision at this point in time. This underscores the need for development of an agreement between State Parks and reallocation project participants that accounts for potential revenue losses once a construction program has been defined.

Some important considerations are noted below:

- The most economical construction program is one that provides for a continuous construction period, rather than a phased program that extends construction over an extended period of time. An extended period would increase the costs estimated for completion of the recreation relocation plan. Again, the ability to implement a continuous program will depend on the timing of funding availability and other factors that can't be predicted at this time.
- A continuous construction program could reasonably complete the required work in 12-18 months. Some work could be completed on a year-round basis without disrupting recreational uses, while other construction should take place during the winter months or other periods when park visitation is low. For example, construction of new facilities at the North Boat Ramp and Marina areas will require closing these facilities during the construction period. For this reason, work on these facilities should be scheduled during the winter months. Conversely, some replacement facility sites, such as the swim beach, are located at a distance from the existing facilities. For this reason, the existing area could remain in use while the new area is being constructed.

For the reasons stated above, it will be necessary to estimate revenue loss at the time an actual construction program has been defined and to base payments for this loss on any actual revenue losses that are experienced rather than a potentially optimistic assumption on the level of disruption that will occur to park visitation.

Table 4.1. Chatfield State Park Economic Impacts

Year	Receipts Collected in the Park from Park Fees	Number of Visitors	Number of Vehicles	Expenditures per Vehicle Inside Park	Expenditures per Vehicle within 50-Mile Radius of Park	Total Park Income Generated per Year from All Sources
1984	457,489					
1985	499,942					
1986	538,596					
1987	672,957					
1988	675,124					
1989	701,552					
1990	533,303					
1991	754,780					
1992	714,120					
1993	725,143					
1994	781,747					
1995	677,261					
1996	850,032					
1997	937,113					
1998	1,037,278	1,329,689	511,419	\$8,054,849	\$19,485,063	\$28,577,190
1999	1,022,284	1,096,203	421,616	\$6,640,452	\$16,063,569	\$23,726,305
2000	1,180,506	1,187,947	456,903	\$7,196,222	\$17,408,004	\$25,784,732
2001	1,237,922	1,373,600	528,308	\$8,320,851	\$20,128,534	\$29,687,307
2002	1,333,170	1,448,895	557,267	\$8,776,955	\$21,231,782	\$31,341,997
2003	1,464,447	1,566,580	602,531	\$9,489,863	\$22,956,431	\$33,910,741
2004	1,378,338	1,496,264				
2005	1,534,028	1,582,811				
2006	1,701,080	1,476,930				
2007	2,010,592	1,505,500				
2008	2,072,051	1,675,197				

Source: Chatfield State Park Manager's Report and Recreation Market Assessment Study

Marina operations, in particular, are likely to experience some disruptions during the reconstruction period. Until a final design is completed and other contract details worked out, it is difficult to identify a precise construction schedule. Therefore, the reallocation agreement should provide for reimbursement to the park and to the marina operator for any revenue loss resulting from a disruption to normal operations. The actual amount of revenue loss would depend on when the disruption occurred and its duration.

Although some concern has been expressed about the potential for a multi-year revenue reduction if all or a part of the use season is lost, recent experience at Horsetooth Reservoir suggests this would not be the case. Reconstruction of facilities at Horsetooth Reservoir, which was completed

in early fall of 2003, required maintaining low water levels for several years and reduced opportunities for boating and other uses. Both the park operator (Larimer County) and the private concession that operates the marina experienced a reduction in revenue during the construction period. These revenues were reimbursed by the Bureau of Reclamation as part of the reallocation agreement. However, once the reservoir resumed normal operations, park visitation quickly returned to normal. According to Larimer County Parks, the marina operator had a waiting list for slips prior to the construction effort and maintained a waiting list throughout that period. A rapid return to normal operations upon completion of construction is the most probable case at Chatfield State Park as well.

COST ESTIMATES

The Recreation Relocation Cost estimate is an opinion of probable costs for the construction and design of the plan elements and areas as shown on the Concept Plans dated January 2009. The following is a detailed description of the cost estimate and the assumptions utilized during cost estimation:

1. The estimate is a Class C estimate due to the conceptual level of planning and design that is in support of this estimate. At the preliminary stages of planning and design, it is very difficult to determine the complete scope of the project in detail; programming of the project is an approximation and is based on project meetings, existing site inventory and conditions, discussions and the designers and cost estimators professional experience. The cost estimate should be used for budgeting purposes only.
2. The conceptual plans and the cost estimate depict in-kind replacement of facilities.
3. The cost estimate is organized into the major site areas as shown on the concept plans. The individual items outlined in the cost estimate are not all shown on the concept plans; they are typical elements found in this type of project, as well as existing site elements inventoried at each site area.
4. The unit quantities are both take-offs of existing features from the concept plans as well as assumptions based on similar project experience. The assumptions are noted in the notes column of the cost estimate.
5. The unit costs are based on current cost estimate data collected from similar types of projects bid in the past few years as well as published cost data information for some project elements. The unit costs are, in our opinion, average construction costs for this type and quantity of project, based in 2008. The cost estimate does not include an escalation factor for development in the future. Escalation varies depending on current economic conditions and could vary between 3-6% per year from the date of the estimate to the start of construction.
6. The cost estimate does not include overall project development or overhead costs that may be accrued if the project is developed in multiple phases.
7. The following contingencies are utilized in the cost estimate:
 - a. Contractors General Conditions. This is a percentage of total construction costs and includes the contractor's costs that are defined in the Division One of the Project specifications and are not generally included in the unit costs. The unit costs included in the estimate do include some Division One items including profit and overhead. General conditions include: Administrative Requirements (Permits, Bonds, Insurance, Scheduling, Submittals); Quality Requirements (Testing, Sampling); Temporary Facilities (Utilities, Trailers, Scaffolding, Tarpaulins, Barricades, Fences, Signs); Equipment Rental; Cleaning; and Commissioning (As-Built, Punchlists, Training O&M Manuals). The percentage for General Conditions can range from 4 to 20%, depending on the size, location, complexity and other variables of the project and estimate. The percentage utilized in the Concept Plan Cost Estimate falls in the middle of this range.
 - b. Contractor's Overhead and Profit. This is shown as a percentage of construction costs for the contractors business costs which include: Fixed Overhead Costs (Federal and state costs, social security tax, risk insurance, etc.) and Variable Overhead Costs (workers compensation, retirement programs, main office overhead). Profit is variable and depends on the scale of the project and schedule. Profit can include both the general contractors and the subcontractors.
 - c. Federal Wage Rate Factor (Davis Bacon Wage rates). This is shown as a percentage of construction costs to cover the cost differences between standard wage rates and Davis Bacon wage rate schedules required on Federally funded projects. This is markup on wage rates only using the assumption that labor is generally 40% of a project costs. This factor is applied to that portion of the costs.
 - d. Concept Level Design Contingency. This is a percentage of total construction costs and is included to cover the many details of the project that are not yet planned, designed, or known at this time. The plans are conceptual at this time; the cost estimate includes many assumptions and professional opinions. Design contingencies for a Class C estimate usually range from 15 to 30%.

8. The cost estimate reflects a percentage allowance for design services, which includes:
 - a. Design Allowance. This is an allowance for the anticipated phases of design that will be required for this project. The allowance includes the following design phases:
 - i. Pre-Design. This phase of design takes the project through the master plan and may include: project programming, design data collection, development of alternatives, value analysis of alternatives, pre-design summary document, design development and Class B cost estimate.
 - ii. Special (Supplementary) Services. This can include: funding for archeology, constructability review, value analysis, final cost estimating, geotechnical surveys, historic structure reports, hazardous materials studies, visual simulation, visitor experience planning, geographic information system, graphics, topographical surveys, public meetings, etc.
 - iii. Final Design. This is the final phase of Design, completing the design development started in pre-design through the completion of approved construction documents for bid negotiations.
 - b. Construction Phase Services. This is a percentage of total construction costs, including Design Contingencies and General Conditions, and may include construction support services competed and/or contracted by the Owner, such as construction management, construction administration, materials and construction testing, surveying, compliance and monitoring services, etc.
 - c. Owners Construction Phase Contingency. This is a percentage of total construction costs, including Design Contingencies and General Conditions, and is an allowance to cover potential changes to the final construction cost from unforeseen conditions, change orders and design changes.
9. Compliance and/or relocation costs are not included.
10. Tree removal costs are not included.
11. The costs included for utilities are assumptions only, as detailed utility plans were not available.
12. Grading costs assume excavation and embankment of material will be from the project site. Prices for hauling and excavation from outside of the project site are included as a separate line item in the cost estimate.

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